Claims

What is claimed is:

1. A method of optimizing the oxidation of molybdenite concentrates comprising:
   a. forming an aqueous slurry of said molybdenite concentrates;
   b. heating said slurry to a temperature of at least about 200°C;
   c. agitating said slurry while in contact with an atmosphere containing free oxygen;
   d. oxidizing said slurry in said atmosphere at an oxygen over pressure of at least about 50 p.s.i.;
   e. regulating the amount of ferric iron concentration and excess sulfuric acid concentration during the oxidation reaction; and thereby
   f. producing a leach slurry wherein greater than about 99% of the molybdenum in said molybdenite concentrate is oxidized.
2. The method of claim 1 wherein less than about 20% or greater than about 80% of said oxidized molybdenum is soluble.
3. The method of claim 1 wherein said molybdenite concentrates contain copper and the copper dissolution is greater than about 99% in said leach slurry.
4. The method of claim 1 wherein said molybdenite concentrates contain iron and the iron dissolution is about 60-90% by weight in said leach slurry.
5. The method of claim 1 wherein the regulating step maintains said slurry in a relatively high excess sulfuric acid level to produce lower soluble silicon levels.
6. The method of claim 1 wherein the regulating step maintains said slurry in a relatively high ferric iron level to accelerate the rate of oxidation.
7. The method of claim 1 further comprising recycling a portion of said leach slurry produced in step (f) back to the forming step (a).
8. The method of claim 7 further comprising determining an approximation of the amount of soluble molybdenum.
9. The method of claim 8 wherein the determining step is accomplished by monitoring concentrate analysis, recycle solution analysis, and pulp density.
10. The method of claim 1 wherein the oxygen over pressure in the oxidizing step ranges from about 80 to about 120 p.s.i.

11. The method of claim 1 wherein the temperature in the heating step ranges from about 210 to about 220 °C.
12. A method of predicting the soluble molybdenum present during the pressure oxidation of molybdenite concentrates comprising:
    a. determining an approximation of the excess sulfuric acid concentration; and
    b. determining an approximation of the soluble iron concentration.
13. The method of claim 16 wherein the determining step (a) is predicted from the concentrate weight and analysis plus the recycled solution volume and analysis.
14. The method of claim 16 wherein the determining step (a) further comprises:
    a. effecting a preliminary calculation of the excess sulfuric acid concentration; and
    b. refining said preliminary calculation by one or more further calculations wherein the excess sulfuric acid concentration value is corrected to compensate for additional molybdenum precipitation.